The Hon. W. Huddleston
with A. T. Arundel's complts.
5/9/79.

~~Item 12~~

130 A. 91 (10)

IRRIGATION AND COMMUNAL LABOUR

IN THE

MADRAS PRESIDENCY,

BY

A. T. ARUNDEL,
B.A., LONDON,
MADRAS CIVIL SERVICE.

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PREFACE.

THE following pages are re-printed, with some corrections and additions, from the columns of the *Madras Mail*, where they were first published with the view of securing a larger circle of readers than they are likely to obtain in their present form. The subject is of considerable interest both to the State and to the community, and the writer hopes that by attracting attention to it, he may aid in the improvement of an important branch of the State administration.

COIMBATORE, *August*, 1879.

CONTENTS.

PAGE

Introductory 5

CHAPTER.

I. Nature of Irrigation Works 6

II. Present System of Management and Supervision—Its Defects 14

III. Legal Position of Government as to Distribution of Water for Irrigation 25

IV. Remedies—Conditions of Communal Labour... 29

V. Remedies (*continued*)—Revival of Communal Labour 37

VI. Remedies (*continued*)—Up-keep and Control of Irrigation Works—Irrigation Boards ... 47

VII. Summary 53

IRRIGATION AND COMMUNAL LABOUR IN THE MADRAS PRESIDENCY.

Introductory.

THE financial embarrassments of the Government of India assume year by year more alarming proportions. The difficulties in the way of reducing expenditure are great, the difficulties in the way of new taxation are greater. Novel and unexpected items of expenditure constantly arise, and bring to nought the best devised schemes of inventive financiers. As far as the Imperial finances are concerned, drastic measures of reform and economy are now inevitable. But successful economy on the grand scale can only result from the aggregate of numerous successful economies on the small scale, and the Government of India have urgently pressed this view upon all the minor administrations and Governments throughout the Indian Empire. The present pamphlet is offered as a small contribution towards the theory and practice of State economy. It is designed to give some prominence to the flaws and imperfections of an important branch of the administration of the Madras Presidency, and to show that by an improvement of system enforced by a legislative enactment, much revenue that is now needlessly sacrificed can be saved to the Imperial Exchequer, and large items of State expenditure be avoided.

CHAPTER I.

Nature of Irrigation Works.

Irrigation Works consist mainly of—

(*a*). River-fed channels, and reservoirs or tanks, and

(*b*). Rain-fed reservoirs or tanks.

Irrigation Channels are artificial water-courses supplied from a river, stream or other source, and tapped by numerous sluices which draw off the water to the lands under irrigation. The water is usually raised to the required height in the river or stream by a masonry weir or dam known as an "anicut," built athwart the course of the river, not only raising thereby the level of the water, but also diverting it into the artificial channel. Most of the rivers in Southern India are thus tapped by masonry weirs at different points. Some rivers are so effectually drained of their supply in this way, that except in high floods, the lower part of their course is dry. Thus the little river Noyel, a tributary of the Cauvery, has a course of only ninety miles, but is drained by no less than twenty-five masonry weirs supplying channels to irrigate over 19,000 acres. The river Tambrapurni in Tinnevelly is drained by eight important weirs irrigating over 122,000 acres. Over the Sittar, a tributary of the Tambrapurni, there are 18 weirs. There are altogether 41 weirs draining the Tambrapurni and its various tributaries.

In many places, channels are made by a diagonal excavation through the river bed and bank, without any permanent weir or dam. These are termed Koramboos. All natural rivers, streams, and other water-courses, not lying within a private estate or Zemindari, are claimed by the

State, and the distribution of the water-supply for the benefit of the public is an important function and duty of the Government. Mr. Justice INNES, in his judgment in the case of PONNASAMI TEVAR *v.* Collector of Madura (5, M. H. C. R. C.) said: "I quite admit that the Government of this country has, at all times, assumed to itself, and *has the right in the interests of the public,* to regulate the distribution for use of any portion of the water flowing in the natural channels, in which rights have not as yet been acquired." The Government further possess and exercise the right of levying a tax or cess from those to whom water is supplied. When water is supplied for irrigation, the charge is either merged into the general rent, or tax, or assessment of the land, or is levied as a water-rate at so much per acre. When water is supplied for Municipal purposes, the charge, if any, is made with reference to the special features of the case. The Municipality of Tuticorin in Tinnevelly, for instance, pay a large sum monthly for the water supplied to the town by the Government channel fed from the river Tambrapurni.

The lands that lie under the irrigation of river channels are usually of two kinds. (1.) They may form part of a delta deposited by the river itself. This is the case with the rivers Godavery, Kistna, and Cauvery, where the bulk of the irrigated lands form part of the great deltas of the districts, Godavery, Kistna, and Tanjore. (2.) They may form riparian tracts, and lie on either bank of the river, usually in long strips more or less parallel to the course of the main stream, forming in fact part of what is usually known as the river-valley. This is the case with the channels from the Cauvery and its tributary, the Bhowani, irrigating large tracts in the districts of Coimbatore and Trichinopoly. So too with the rivers Pennar in Nellore, Palar in North Arcot, Vigay in Madura, and Tambrapurni in Tinnevelly. Occasionally a hilly ridge or watershed may be cut through, and water carried completely out of the natural river-valley. This is the case with Kurnool and Cuddapah Canal from the river Toongabudra.

The irrigation channels thus supplied from the rivers will vary in length according to the size of the river, the water-supply made available by the weir, and the extent of land which the physical conformation of the country will allow to be brought under irrigation. One of the channels from a weir over the Noyel in Coimbatore is only two or three miles long, and irrigates only 50 acres. The Kalingarayen Channel supplied by the river Bhowani in the same district has a course of 56 miles, and irrigates 7,980 acres, paying an assessment of Rs. 87,600 (£8,760). The main channel of the eastern delta of the Godavery district and its offshoots comprise a total length of 150 miles. This canal is 184 feet broad, and 8 feet deep at the head. The water that pours through these various irrigation channels is drawn off by numerous sluices built in and through the channel bank, at varying intervals, wherever required. An irrigation channel may be compared to the water-main or pipe that carries the water-supply of our cities and towns in England. The main receives its supply from the river or from the reservoir, and is tapped by numerous smaller pipes throughout its course. Each of these small pipes supplying dwelling houses, factories, &c., is regulated by a stop-cock or tap, which arrests the flow when the proper quantity of water has been drawn off. In the absence of such stop-cocks, it is obvious that the water would escape and run to waste through every minor pipe; only those near the head of the main would be certain of their supply, and those at the extreme end of the main would probably fall short and run the risk of having no water at all.

Now the principle is exactly the same with the channels for irrigation, with this all-important difference. The irrigation channel has no self-acting stop-cocks, and but too frequently no stop-cocks or taps at all. The better sluices have moveable shutters, by which they can be closed, but for the most part they are mere masonry pipes or apertures which can only be closed with difficulty by plugs of turf and stone, or mud. Sometimes there is no masonry work, but the channel bank is cut right through, to allow the water to flow on to the lands to be irrigated. One of the channels from a weir across the river Noyel in the Coimbatore District, which is intended to supply a large tank or reservoir, and irrigate 1,380 acres, has only two masonry sluices, and the supply in the reservoir often fails, because the channel is drained by various cuts through the bank before it reaches the reservoir. In such cases the higher the level of the water flowing in the channel, the greater is the amount drawn off through the open cut, and the greater the waste.

It is obvious that the extent of land to be irrigated by each sluice, must vary with the level of the land and other circumstances, so that one sluice may irrigate ten acres, while another may irrigate a hundred, and so on. Clearly, then, the sluices should have apertures corresponding with the area of land to be irrigated. If from a London water-main the supply pipes to a big brewery and to a small dwelling were of the same size, we should say there was a radical mistake. Either the brewery must get too little water, or the house must get too much. This radical mistake is of constant occurrence in the sluices of the old irrigation channels. The sluices are often built with little or no reference to the area to be irrigated, further than to make sure that the vent or aperture is amply large. With sluices built on this principle, or want of principle, throughout the course of a long channel, it will readily be conceived that the water-supply may be all drawn off, before it can reach the sluices at the far end of the channel. Open cuts through the bank, in lieu of sluices, of course make the mischief still greater.

The following figures give the sizes of a few consecutive sluices, with the areas to be irrigated by them, in an important channel from the river Noyel, which has to irrigate altogether 4,000 acres of land. There are nearly 70 sluices in this channel, and the following list is an excellent sample of the rest, and of the sluices in numerous other channels as well.

Sluice No.	Aperture size in inches.	Area irrigated in acres.
32	16 × 16	76
33	16 × 16	15
34	14 × 14	6
35	12 × 12	20
36	14 × 14	194
37	14 × 14	40
38	14 × 18	20
39	Open cut through bank	14
40	28 × 18	41
41	24 × 26	10
42	11 × 6	4
43	15 × 16	119

Here it will be seen that the largest area under any one sluice is 194 acres, and that the aperture of that sluice, No. 36, is 14 inches square. But the next sluice-vent, No 37, is the same size, and has to irrigate only 40 acres. The next again, No. 38, is still larger and has to irrigate only 20 acres. Worst of all, No. 39, an open cut or gap through the channel bank, irrigates only 14 acres. The largest sluice-vent of all, No. 41, is a huge cavity more than two feet square, which has to supply only the trifling area of 10 acres.

The amount of water wasted in this way is almost incredible. At spots where the drainage of irrigated tracts collects, volumes of water may often be seen pouring into the river when the crops at the lower end of the channel, some miles further down, are withering for want of the very supply that is being wasted above. Large sums of land assessment are by consequence annually lost to the State revenue, and tracts of land are left fallow or grow inferior grain, that under a better system would be yielding heavy crops of rice. The loss, however, falls most heavily on the ryots or farmers. If the distribution of the water is left in their hands, and there has been no drought or scarcity of water, the failure of crop at the lower end of the channel is usually regarded by the revenue authorities as the fault of the ryots, and the land tax is collected from them instead of being remitted. In 1875-6, Rs. 1,10,725 (£11,072) were thus collected in the Tanjore District alone, on account of about 30,000 acres left uncultivated for this reason. Over the whole Presidency 136,000 acres were similarly left uncultivated and the land assessment thereon, amounting to Rs. 5,78,000 (£57,800), was collected. The farmers are thus doubly losers, for they not only lose the crop which should maintain them and their families, and meet the land tax, but they have to find means to pay the tax into the bargain. If, however, the tax or assessment is remitted, they are impoverished in failing to raise the crop, for which an ample supply of water exists.

Nothing has been said so far of the necessity for the careful conservancy and repair of the channel banks. As irrigation channels from their very nature are above the level of the adjacent country which they irrigate, it is obvious that they must be confined by an artificial bank on one or both sides. Generally speaking, as channels are led along a gently sloping country, the artificial bank is required only on the lower side. Here, however, it is of the utmost importance, as the existence of the channel depends on the stability of the bank. Such banks are almost invariably of earth, and are liable to injury and deterioration by the attrition of the water flowing in the channel, and by the passage of men, cattle, and carts, at various crossing places. When the channel is in flow, damage by attrition is usually detected and set right by the villagers at once. It is during the dry season, however, when there is no water in the channels, that the banks are chiefly injured by traffic. When the rainy season begins, it is often ushered in by a heavy flood, and all weak places in the channel banks are severely tested. If the bank is unable to bear the pressure, or if it be over-topped by the water, a breach occurs, and great damage ensues, both to the bank and to the fields below, which timely attention and a trifling amount of labour would have prevented.

Tanks.—The artificial reservoirs of water for irrigation are known throughout Southern India as tanks. They vary in size from mere ponds, irrigating two or three acres to considerable lakes, like the Chembrambakam Tank near Madras, which irrigates nearly ten thousand acres in thirty-three villages. Tanks may receive their water-supply either by means of channels from rivers, or by means of streams or water-courses fed by the local rainfall of a more or less extended area. Most of the foregoing remarks regarding river-fed irrigation channels, will apply with equal force to the reservoirs supplied by them. A few words, however will be necessary regarding the second class, usually known as rain-fed tanks, the number of which, large and small, in the Madras Presidency is above twenty-five thousand. The vast majority of these reservoirs were built by, or under the orders of, the native rulers prior to the British conquest. They usually consist of a great crescent-shaped earthen bank or dam, thrown across the drainage slope of the country, thus arresting the passage of the water, which is dammed up against the bank, and reaches backwards as far as the rising slope of the country will permit. The safety of the bank is usually secured by a waste weir of masonry, over which the surplus water flows, when the tank is as full as the gation by means of one or more sluices, usually of masonry, under or through the bank. Most of what has been said regarding channel-sluices applies equally to the sluices of these rain-fed tanks. The reservoirs, however, are liable to injury from causes special to themselves alone. During the enquiry of the Public Works Commission in 1869, there was generally concurrent testimony to the fact that whatever the ryots might do for irrigation channels, they constantly neglected the rain-fed tanks. Neglect of, or injury to, a channel was at once apparent, and the labour expended on repair was immediately and obviously repaid. With rain-fed tanks, however, the case is quite different. The supply to many, if not most of them, is uncertain. The bank may be worn down by cattle in the dry season and otherwise injured, but if the rainfall be scanty, or even moderate, no harm may ensue that year or the next. The waste weir itself is blocked up to a higher level by turf and stones and planks, to retain as much as possible of the precious water, and it may not be till a flood comes and tears a large gap through the bank, that the villagers recognize too late the precarious condition their reservoir was in.

CHAPTER II.

Present System of Management and Supervision. Its Defects.

It is necessary now to examine a little further, and enquire into the cause of the comparative inefficiency of so many of our old irrigation works.

Management and Supervision.—The management, control, and up-keep of the irrigation channels, and the distribution of water, is usually shared between the two administrative departments chiefly concerned, viz., the Department of Public Works, and the Revenue Department including the village officials. The up-keep and repair of the channels sometimes rests with the Engineers and sometimes with the villagers. In the former case the cost comes out of State funds. In the latter case, the villagers supply what is called "customary labour" (kudi maramat), or money or grain in lieu of it, according to their own arrangements. The former method fails from its irregularity. The Government allotment for repairing a channel, removing sand, silt, weeds, &c., is not a fixed annual amount, but is liable to vary with the demands for repairs elsewhere, and with the condition of the Imperial exchequer, which ruthlessly cuts down the allotment for a whole district or Presidency, when the financial equilibrium of the Empire is uncertain. The allotments, moreover, even when funds are available, are not as a matter of course, made annually, but often at intervals of several years, during which time the channel is silting up, becoming choked with weeds and vegetation, and generally deteriorating. A small sum spent annually in removing silt and strengthening the channel banks is far more effective than a larger sum spent at intervals of several

The system under which the repairs are left to the villagers is more in accord with the habits and customs of the people, and was in ancient times almost universally in force. It fails from its uncertainty. Under former rulers each man was *compelled* to contribute his quota of labour or money and all repairs were carried out in this manner with supplementary assistance from the State. Under the British rule, in spite of an Act (No. I of 1858) passed to maintain the system, such customary labour has been falling into disuse; and the provisions of the law are insufficient to secure it. If State funds are spent by the Department of Public Works, the villagers naturally leave everything to the State, and do as little as possible themselves. If, as is sometimes the case, the customary labour is commuted by the villagers themselves to a money equivalent, it is practically impossible for the revenue authorities to enforce payment of the amount, and see it properly spent. The evidence recorded by the Public Works Commission in 1869 shows that the provisions of the Act for this end are quite inoperative.

The admission of the water into a channel through the head sluice, if there be one, is usually in the hands of the Department of Public Works. The actual distribution, however, of water from the channel, rests sometimes with the Engineers, and sometimes with the Revenue authorities or the villagers. The two departments in concert are supposed to decide on the needful repairs and changes, removing silt, sand, and weeds, enlarging or reducing old sluices, building new ones, and generally regulating the distribution of the water. On all channels of any importance, there is usually a small staff of subordinates who are entrusted with the duty of opening and closing the sluices, and looking after the distribution of the water throughout the whole length of the channel. They are sometimes paid by a deduction from the revenue and sometimes by contributions

The double responsibility for the channels, shared by the Revenue authorities and the Department of Public Works, too often results in failure. What is the business of either department, is apt to become the business of neither. The officials of each are apprehensive of trenching on the rights and duties of the other, or, worse still, are jealous lest their own rights and functions be trenched on by the others. If the revenue officers find a great waste of water going on, they will perhaps wonder why the Engineers do not build a better sluice. If the Engineers note the same thing, they will think it odd that the revenue officers permit such a lavish and unnecessary supply of water. On special and important occasions, the two departments unite with ease to effect the needful arrangements. But for ordinary affairs, each department, having its own special work, is not brought into contact with the other. There is no regular and consistent concert between the two.

The consequences of this maladministration are usually patent enough. The ryots or native farmers are not trained or accustomed to economize the water, and, thinking only of their personal interests, never dream of arresting the rush of water through the sluices leading to their fields, after they have drawn off enough for their own needs. They prefer an abundant flow of water on account of the fertilizing silt which it deposits on the fields, and they will often tear down the masonry of a sluice with a crowbar, to enlarge the vent, and so ensure an abundant flow. In some channels under the care of the Department of Public Works, where the sluices are fitted with shutters fastened by lock and key, the latter is often left with the overseer of that department, whose other duties prevent him from giving an uninterrupted attention to the distribution of water; and complaints arise that enough water is not allowed. As prompt action is needed to save a withering crop, the villagers find the crowbar more efficient than circuitous complaints through a series of officials; the masonry of the sluice is torn down, and the water rushes through in volume to the detriment of crops lower down the channel. In many cases, the damage is done without even the show of excuse just mentioned, but simply to secure a large flow of water over the fields. The mischief is usually effected during the night, when there is little or no fear of eye-witnesses to offer legal evidence in support of a prosecution. As a matter of course, the offenders escape detection and punishment. It is the interest of no one, save the landholders lower down the channel, to bring the mischief to light. These latter do not care to waste time and money in complaints, too frequently fruitless, at the public offices.

Besides the injuries done to existing sluices, further damage is caused by new cuts through the channel bank, or by the building of additional sluices, which are not only superfluous, but involve great waste of the fertilizing water. The first step taken by the ryot concerned, is to secure by persuasion or purchase the silence of the village officers, and the channel overseers (monigars). The new cut is then made, and probably escapes notice by the superior officers for a considerable time. If enquiry be made, the village officials represent that the extra supply is essentially necessary to the irrigation of the village. In course of time, the open cut is seen by a superior officer, who, very possibly ignorant of the former condition of the channel, is led to suppose that it has been properly authorized. A storm of protests is raised at the suggestion of closing the cut; and the only remaining course is to limit the flow and strengthen the bank by building a masonry sluice. This is accordingly done, perhaps at the voluntary expense of the landholder or farmer profiting by it; and the villages at the further end of the channel are made perpetual sufferers in consequence of this additional drain on the supply.

It may be remarked *en passant* that no thorough improvement or reform can be effected until there is a complete map or plan of every channel, showing every sluice and masonry work, and every cut, and the area irrigated by each, ready for reference by both the revenue officers and the Engineers. There is probably not a single district in the Presidency, where such sketches and lists are in existence for every irrigation channel in it. What should we say in England of a Water Company that had no accurate information of the number of taps and minor pipes taken off the main? The shares of that Company would hardly be at a premium. A case recently come to notice, where a channel overseer (monigar) had never seen for five months, and of course had never brought to the notice of his superiors, a considerable breach in a channel bank which effectually prevented a large reservoir or tank from receiving a supply of water. The result of the present system of management, or rather mismanagement, may be expressed as leaving the ryots to do as they choose with the water-supply, to the constant detriment of the villages under irrigation at the end of the channel, and, by consequence, to the serious loss of the State revenue. The evil results of such mismanagement are steadily increasing. Every new sluice not absolutely needed for irrigation, means so much taken from the water-supply of villages lower down the channel. This is the true explanation of the dearth of water at the end of many of our large channels, and of the necessity of permanently transferring large areas once irrigated to the head of "dry." Such changes are sometimes attributed—with what injustice may be now seen—to the scantier rainfall and defective water-supply of the rivers in recent times.

In illustration of the actual working of the system described in the preceding pages, the following particulars are given regarding a small channel supplied from the third weir across the river Noyel. It is one of the twenty-five fed by that river, which, together, irrigate 19,000 acres yielding a revenue of Rs. 1,40,000 (£14,000.) It has a total length

Between the head or beginning of the channel, and the first of the four reservoirs or tanks, there were, a short time ago, eighteen sluices and one open cut through the bank. The sluices had vents of such capacity that they would suffice to irrigate an area of over three thousand acres. The area actually irrigated by them is only 183 acres. None of the sluices were provided with shutters or plugs.* Huge volumes of water of course escaped into the river before the channel reached the first reservoir. Last season (1878) 200 acres that ought to have been irrigated lay waste, or grew inferior crops, and Rs. 700 (£70) of State revenue was lost owing to deficiency of water. To bring about a better state of things, the chief landholders, at the suggestion of the authorities, consented to defray the cost of regulating the sluices in question, and the Engineer found everything could be set right for Rs. 325 (£32-10) or half

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* The following is a list of the sluices referred to, with the sizes of the old apertures and the area irrigated by each. Fractions of acres are omitted. The facts are striking enough. The smallest plot is only 2 acres in extent, and had a sluice-vent a foot high by a foot and a half broad to irrigate it! The largest vent was a foot and a half high by two feet three inches broad, and had to irrigate only 12 acres! The twentieth sluice at the first reservoir or tank happens to be 14 inches square and it irrigates 204 acres. As 14 inches square is the average size of the apertures of the previous 19 sluices, multiplying 19 by 204, we get 3,876 acres as the area capable of irrigation. The result is, of course, true only on the supposition that there is a flow of water in the channel to correspond.

No. of sluice.	Size of old aperture.	Area irrigated.	No. of sluice.	Size of old aperture.	Area irrigated.
	Inches.	Acres.		Inches.	Acres.
1	12 × 15	8	12	10 × 7	7
2	18 × 18	11	13	12 × 21	5
3	12 × 15	10	14	9 × 9	4
4	open.	3	15	10 × 10	3
5	12 × 18	2	16	15 × 15	5
6	12 × 12	15	17	18 × 21	12
7	12 × 18	18	18	12 × 14	6
8	12 × 12	3	19	13 × 18	12
9	18 × 15	33			
10	10 × 18	14			183
11	18 × 27	12			

the sum lost to Government in a single year. The money was paid as promised, and the work has recently been completed by the Department of Public Works.

The actual loss of revenue on the twenty-five channels supplied by the Noyel river in 1875-6 was Rs. 27,856 (£2,785) on 3,051 acres. As the total revenue should be Rs. 1,40,000 (£14,000), this is a loss of 19 per cent. It is not asserted that the whole of this amount could be saved to Government by careful economy of water. That the bulk of it, however, would be saved, is certain. It is difficult, if not impossible, to show by figures the full loss to Government, or to the cultivators, by the waste of water for irrigation. In many instances the landholder, finding the water supply insufficient, sinks a well to supplement it, and continues to pay the high tax for irrigated land, although no crop would reach maturity without constant irrigation from the private well. Here the cultivator is the loser, for if his land had been properly irrigated from the channel, he might have invested his capital in sinking the well on unirrigated land elsewhere, or otherwise have utilized it. In other cases, as the channel supply is insufficient to raise rice, an inferior grain (ragi, cholum, &c.) with smaller yield is grown instead. Sometimes the full tax is levied on such land, and sometimes a reduction is made. Loss thus ensues certainly to the cultivator, and often to the Government.

In other cases again, lands which would be irrigated if the channel water were properly economized, have been left without irrigation for so long that they are transferred in the public accounts to the head of unirrigated, and only the tax for unirrigated land is charged against them. Here both the cultivator and the Government are permanent losers. There are two fine channels fed by the Bhowani river, which irrigated at the beginning of the century 16,000 acres. Of this area 500 acres have been permanently transferred to "unirrigated," and a revenue of Rs. 1,400

(£140) per annum is lost to the State. Both of these channels receive a supply of water amply sufficient for all needs, and calculations regarding the larger one show it to be capable of irrigating 12,000 acres more than the area it now supplies, which is 12,700 acres. In two taluks or sub-divisions of the Tinnevelly District 440 acres formerly irrigated have been re-registered as "dry," and a permanent loss to the State of Rs. 2,150 (£215) per annum has ensued. These are but casual illustrations of the matter in hand. No such information for the whole Presidency is on record.

Colonel MULLINS, in his minute, printed with the Report of the Public Works Commission of 1869, remarked:—

> "The distribution and management of water in Tanjore is virtually free from any Government control whatever, though occasionally the revenue officers do interfere to prevent loss of crops by diverting water to those parts of a taluk, which, from whatever circumstances, may be receiving a totally inadequate supply; and under very great emergency, the Collector has occasionally intervened to divert water from lands which were not receiving too much water to those which were getting next to none at all. It does not require argument to show that the absence of any administration of the water-supply by the officers of Government, and leaving distribution practically to be managed by those who have in most cases cultivation of their own, and who cannot possibly be supposed to study the general interests of the community, until, at least, their own interests have been fully provided for, must lead to great abuses, as also to a great waste of the water-supply."

There are 10,000 acres of land in the Tanjore District, nominally under the irrigation of the river Cauvery, which, by the accounts of 1875-6 lie waste for want of water, and the assessment thereupon, roughly amounting to Rs. 50,000 (£5,000) is annually lost to Government. Writing in 1869 of one of the taluks now referred to, Col. Mullins remarked: "As there is plenty of water, it must be a matter of great regret that this water is not made available, but suffered to run to waste into the sea." The loss to the native farmers and therefore to the wealth of the district, is in the rich district of Tanjore more than twice the amount of the assessment, or more than a lac of rupees (£10,000) per annum.

Similar facts and figures are not available to show accurately the loss from waste of water to Government, and to the wealth of the country, throughout the whole Presidency. The following statement, however, (compiled from the revenue returns of 1875-6), will throw considerable light on the matter, and will not err on the side of exaggeration. Excluding from consideration the districts of Ganjam, Salem, Malabar, South Canara, Godavery, and Kistna; the first two because no information is available, the second two because they possess no irrigation works properly so called, and the last two for reasons to be given below, the following result remains. In 1875-6 the area throughout the Presidency actually watered by the *chief* sources of irrigation (omitting minor works and ordinary rain-fed tanks) was 1,309,000 acres, paying a land assessment of Rs. 74,50,000 (£74,500). But the area nominally watered by the same sources of irrigation is 1,465,000 acres, assessed at Rs. 81,01,000 (£810,100). It thus appears that an area amounting to 156,000 acres, assessed at Rs. 651,000 (£65,100), ought to have been under irrigation, but was neither occupied nor irrigated, and the land assessment was by consequence lost to the public revenues. Now it would be both rash and incorrect to assert that every acre of this large area would be irrigated and cultivated, and every rupee of the 6¼ lacs (£65,000) of land assessment added to the revenue under a sound system, and with thorough economy in the distribution of the water. But the fact remains that all minor irrigation works are excluded from the foregoing statement, and only the chief sources of irrigation are considered. The reader may be left to draw his own conclusions. One thing may be regarded as certain, namely, that the present waste in the distribution of water from our *chief* irrigation works alone, involves an annual tens of thousands of pounds, and that for every rupee lost to the State, from two to three are lost to the native farmer, and by consequence to the general wealth of the country.

A word of explanation is needed as to the omission of two of the richest districts of the Madras Presidency, Godavery and Kistna, from the foregoing comparison. The splendid irrigation-works of these two districts are comparatively recent, and in 1875-6 watered from the principal works an area of only 405,000 acres out of 927,000 acres which they are capable of supplying. The comparatively small area actually under irrigation is due, not to waste or want of water, but rather to undeveloped industry and agriculture. To have included these districts in the comparison, therefore, would have been only to mislead.

With regard to the losses accruing to the native farmers from the waste of water, figures are fortunately available to show what the *minimum* of such losses must be. As already remarked, the land assessment is not remitted by Government when irrigated lands are left uncultivated owing to causes within the farmer's control. That is to say, if the water-supply was abundant, but was wasted in distribution, the land assessment is levied as usual. The extent left uncultivated by the ryots owing to other causes than this, is so trifling that it may be disregarded. Now in 1875-6, the area of irrigated land thus left waste throughout the Presidency was 136,000 acres, but the assessment thereon, amounting to Rs. 5,78,000 (£57,800), was collected. Now we know that if a rice crop be raised, the farmer's profit is, at current prices, at least twice the amount of the land-assessment he has to pay to Government. The *minimum* loss then to the community through waste of water for irrigation in 1875-6, must have been the amount by which the farmers were out of pocket without any return, namely, Rs. 5,78,000 (£57,800), together with an additional sum of twice that amount, which they would have realized as income and profit, if crops had been grown; or in all Rs. 17,34,000 (£173,400.) This, then, was the *minimum* loss to the community from waste of water in 1875-6.

But the actual loss was far greater. The irrigated lands left uncultivated owing to causes beyond the farmer's control amounted to 240,000 acres, and the assessment thereon, Rs. 10,52,000 (£105,200), was remitted by Government. In addition to this a sum of Rs. 11,90,000 (£119,000) was remitted by Government on account of short produce, withered crops, and other causes arising entirely from deficiency of water. Altogether Rs. 22,42,000 (£224,200), were remitted by Government on irrigated land under occupation, owing to want of water. Much of this loss was no doubt unavoidable and resulted from failure of local rains, but a large sum, difficult to estimate, but certainly reaching to some tens of thousands of pounds, would undoubtedly have been saved to the public revenue, and a sum more than twice as great to the wealth of the country, under an efficient and economical distribution of water from all the State irrigation works throughout the country.

CHAPTER III.

Legal Position of Government as to Distribution of Water for Irrigation.

The apparent supineness of both the great administrative departments, Revenue and Public Works, in effectually checking the wasteful habits of the ryots, and regulating the discharge of sluices by reference to the area to be irrigated, is further explained by their ignorance in many cases of the legal aspects of the question, of the actual rights of Government, and of the measures they are entitled and bound to take to protect the interests both of the public and of the State. It would be an advantage if the administrative heads of the two great departments would make a point of giving to public officers full information on this important matter, when any decision affecting it is given by the High Court. The Board of Revenue in particular have in their Standing Orders an excellent medium for making known the state of the law and the course that should be adopted by district officers. There is no doubt that the interests of the Government and of the community are at times injured, because officers, being doubtful about the law, hesitate to put down a public evil lest they should find themselves defendants in a legal suit. It may be useful here to refer to the two important decisions of the Madras High Court which declare the law as to the rights of Government in the distribution of water.

The first of these cases is given at length in Madras High Court Reports, Vol. V., 1869-70, p. 6. The plaintiff in this case was a Zemindar, and the result of the appeal was the declaration that with regard to proprietary land, such as Zemindari estates, the Government has no right to limit or modify the regular supply of water through an artificial channel irrigating such land.

> "Regular Appeal No. 122 of 1868.
>
> "Ponnasami Tevar, Appellant (Plaintiff). The Collector of Madura and 25 others, Respondents (Defendants.)
>
> "The Plaintiff brought a suit to establish his right to an uninterrupted flow of water through a channel which ran into a tank in a village which was the plaintiff's property, and to compel the removal of sluices erected across the said channel by the 1st defendant's predecessor in office, and used for the purpose of diverting the flow of water.
>
> "*Held*, that acquiescence in the sense of mere submission to the interruption of the enjoyment, does not destroy or impair an easement. To be effectual for that purpose, it must be attributable to an intention on the part of the owner to abandon the benefit before enjoyed.
>
> "*Held* also, that the diversion of the water was a continuing injury down to the time of the institution of the suit, and that the plaintiff's suit was not barred.
>
> "*Held* also, that it must appear from the circumstances in evidence in each case that the interference or obstruction complained of is not a trivial but a substantial injury, in order to warrant relief by way of injunction.
>
> "*Held* also, that the right to an easement in the flow of water through an artificial water-course is as valid against the Government as it is against a private owner of land.
>
> * * * * *
>
> "The result is that the decree of the Civil Court must be reversed and a decree passed declaring the right of the plaintiff, and prohibiting the obstruction of the flow of the water . . . and the diversion of any portion of it. . ."

The second case is given in the Madras High Court Reports, Vol. VII., 1871-4, p. 60. As in the former case it is laid down that the Government cannot interfere to regulate the customary supply of water to Zemindari lands, so in the present case it is declared with equal distinctness that the Government have full power to do so with respect to ryotwari lands. In ryotwari lands the Government are "landlords," the ryots, as Mr. Justice KERNAN said, "are tenants from year to year . . . . with a right, it is assumed, of continuous occupation, paying rent which may vary

"Kristnayyan and 5 others—Appellants. Venkatachala Mudali and 2 others—Respondents.

"Suit to obtain an injunction to close a new channel made by the Superintending Engineer, the 2nd defendant, for the supply of water to the village of the 1st defendant.

"Civil Court dismissed the suit.

"On appeal it was contended, 1st. That the plaintiffs had an absolute right to the uninterrupted flow of all the water in the Kaduvai Channel, without substraction or diminution by the defendants, or by the Government represented by the 2nd defendant, and that any diminution though not causing loss was an invasion of their rights.

2nd. That if they had not such absolute right, they had a right to a supply of water for the necessary purposes of irrigation and otherwise for their village, and that the possibility of loss at some future time, arising from a possible wrongful diminution of water to their detriment through the new sluice and channel entitled them to the relief claimed.

"Upon the first point *Held.* That the plaintiffs had not the exclusive right to the water contended for by them, but that their right was limited to the beneficial enjoyment of the water for the irrigation and other necessary purposes of their tenancies as heretofore enjoyed. Also that the Government, as proprietor of the Kaduvai Channel and water in it, had, subject to the above limited use by the plaintiffs and other villages in the same position as the plaintiffs', a right to distribute the water of Kaduvai Channel for the benefit of the public.

"Upon the second point *Held.* That no ground existed for granting an injunction, as no right of the plaintiffs had been invaded, no damage had accrued, and no case of prospective damage had been made out.

"Ponnooswami Tevar *v.* Collector of Madura, 5 M. H. C. R. 6, distinguished.

"*Innes, J.*— . . "What plaintiffs really claim, as was admitted at the hearing of the appeal, is an easement to the uninterrupted flow of water by the artificial channel called the Kaduvai. The Government, the common landlord of plaintiffs and 1st defendant, alters the distribution of water in a manner which plaintiffs consider prejudicial to them; plaintiffs step in and claim a right to the continuance of the old mode of distribution.

"It is elementary law that an easement cannot be claimed in respect of a tenement, but by the owner of that tenement, and plaintiffs are in no sense owners of the village lands or of any portion of the village lands in respect of which they claim this right. The plaintiffs are tenants from year to year; and though custom or contract may practically attach to each several tenancy the incidents of a permanent holding, defeasible only for non-payment of the assessment which may from time to time be imposed, they have nothing approaching to an absolute estate of the land. Now, an easement implies an absolute outright grant to some person of an incorporeal right appurtenant to his corporeal property. Such a grant cannot be conceived as made to a tenant in respect of a tenement in which his interest is precarious. A grant of this kind therefore cannot in such a case be implied, or in other words there can be no easement claimed by a tenant as against his landlords. But there is nothing in the nature of the plaintiffs' relations with the Government to prevent their possessing, as tenants, rights limited by the duration of their interest in the land. Such rights, however, must arise either by the express contract of letting or by implication from that contract. The question therefore now presents itself whether the plaintiffs under their several contracts of letting can claim a right to prevent any diversion of the water of the Kaduvai channel for the use of the ryots of other villages. In letting irrigable land with existing conveniences for the supply of water for the purposes of irrigation, the landlord no doubt impliedly engages, if nothing to the contrary is expressed, that the existing arrangements for the supply of water will not be interfered with to the prejudice of the tenant during the continuance of the tenancy; and as the plaintiffs' tenancies are from year to year, it may be taken that this engagement is yearly renewed. But I do not think that anything beyond this can be implied from the nature of the tenancy. The case reported in 5 M. H. C. R. 6 [the previous case quoted above] . . . has no analogy to this. That was a case in which the plaintiff was the proprietor of the tenement in respect of which he claimed the easement, and was therefore in a position to claim it, which the plaintiffs are not. That case therefore may be dismissed from consideration. Limiting plaintiffs' right to this, that they are entitled to demand in respect of their several tenancies that no new arrangement for the distribution of water shall be made to their prejudice during their tenancies; and applying this proposition to the admitted facts of the case; are the plaintiffs entitled to the relief prayed? The Government, whom the second defendant represents, has the undoubted right to regulate the distribution of water supplied to its ryotwari villages. . . . . So far as appears, therefore, there is no reason for apprehending any breach of their contract on the part of Government. In what they have done, they have merely acted in accordance with their rights as landlord, and with their duty as guardian of the interests of the community. . . . ."

CHAPTER IV.

Remedies—Conditions of Communal Labour.

The remedies necessary to ensure the efficient administration of our Irrigation works are mainly two.

First.—To enforce, systematize, and extend the old customary common labour (Kudi-maramat) or an equivalent for it.

Second.—To secure an effective control over the distribution of the water under conditions that will as far as possible have regard to the various interests, both public and private, that are concerned.

Conditions of Communal Labour.

Communal labour for common objects has existed in India from time immemorial. The social, administrative, and political unit has always been the village community. The members of the village community, under the guidance of their headmen, were accustomed from the earliest times to unite in common effort to effect arrangements for their own welfare and to carry out the orders of the ruling power. In the early days of British rule, as under the native Governments, the land assessment was due and was paid by the village as a whole, and not by the ryots as individual payments to the State. At the commencement of our rule it was hoped and expected that all irrigation works would eventually be maintained by the village communities concerned without cost to the State, although from the first it was clear that State funds must be advanced on loan to put them into a satisfactory condition to begin with.

But even at the beginning of the century, Colonel, afterwards Sir THOMAS MUNRO, discerned the futility of leaving the irrigation works entirely in the hands of the natives. In a letter from the Madras Government, dated 28th October 1808, to the Court of Directors, mention is made of a plan "proposed by Lieutenant-Colonel MUNRO," suggesting among other things that "the repair of tanks not rendered private property should be made by Government." The proposal does not seem to have found favour, for, on the 29th February 1812, the Government of Madras report to the Court of Directors a plan of Settlement, which "provides for the continuance in the first instance if necessary of limited advances of tuccavy (money loans), by Government for the expense of repairing the larger tanks, and for occasional remissions which extraordinary calamities may render requisite. . . . The necessity for granting occasional remissions and for expenses of tuccavy (money loans) and tank repairs which may for some time be requisite, will diminish by degrees in proportion to the gradual improvement of the country, and ultimately will entirely cease. These are not speculative views," &c., &c. (p. 520, Vol. I. *Selections of papers from the records of the East India Office.*)

On the 28th January 1813, the Board of Revenue wrote :—

> "It may be proper to observe that under the Settlement now in progress with the actual landholders, it is not contemplated that the aid of Government in the execution of repairs can be wholly withdrawn; but, on the other hand, whatever disbursements may be made having for their object the *extension of agriculture* will be made under engagements which shall secure to Government either full reimbursement of the expense, or participation in the improvement by a reasonable proportionate advance in the assessment."

In a note it is said that the preservation and repair of the more considerable tanks and water-courses must still be left with the Collectors, more particularly in Tanjore.

The Court of Directors, in a letter to the Madras Government dated 17th December 1813 (page 509), remark :—

> "The ruinous state of the tanks and water-courses in this province (North Arcot) has, we trust before now engaged your serious attention

pected that they will execute the necessary repairs with only a three years' interest in the land, supposing even that they possessed capital to disburse on such an object, which from their general poverty can hardly be the case. The expense therefore must *in the first instance* be incurred by Government and we look for indemnity in the more favorable terms of a future settlement."

It will be seen hereafter that this hope has never been realized in the "future settlements." It should specially be noted that the anticipated expenditure was to put the tanks, &c., into good order to begin with, and the tenor of all the passages quoted, except Sir THOMAS MUNRO'S proposal, is that, when once put into good order by Government, they should be kept so by the people themselves. The latter expectation has in the main been completely disappointed; the people have not maintained the various irrigation works in an efficient condition, and the Department of Public Works annually expends large sums from Imperial Funds upon the up-keep and repair of those very works which it was originally hoped would be properly maintained by the people themselves. The expenditure in the Public Works Department for 1878-9 in the Madras Presidency on Irrigation repairs alone was estimated at Rs. 15,50,000 (£155,000). Besides this, establishment cost Rs. 7,79,000 (£77,900) and tools and plant Rs. 1,57,000 (£15,700). This is independent of an expenditure of Rs. 766,000 (£76,600) on original works.

But the Communal labour, though it has languished almost everywhere, and is in many places almost in a state of suspended animation, has never completely died out, and exists in various forms and various degrees in different parts of the Madras Presidency. It has on the whole become most lethargic in those places and upon those works, such as rain-fed reservoirs, where only a trifling expenditure of labour is regularly needed, and where the results of neglect are not immediately felt. It flourishes with the greatest activity upon works such as temporary dams in penditure of time, money, and labour is greatest, and where the neglect of common duties is immediately followed by common loss or common ruin.

The pages of the Reports of the Public Works Commission in 1869 contain abundant evidence supporting the view here taken. The comparative neglect of the rain-fed tanks by the ryots is dwelt upon by witnesses from all parts of the Presidency, and there is a similar concurrence of testimony that it is upon river-channels that such communal labour as still exists is chiefly spent. The extent to which this labour is given varies greatly even in different parts of the same district. In the south of the District of Coimbatore, there are channels where nearly Rs. 2 per acre on the irrigated area is voluntarily collected and spent by the ryots. A voluntary cess of 4 annas (sixpence) per acre, amounting to about Rs. 4,000 (£400) per annum, is levied to pay for the channel overseers and watchmen on two important channels fed by the river Bhowani. On the other hand, the communal labour expended on the numerous channels and tanks supplied by the river Noyel is practically nothing.

On the whole, the greatest amounts, though not the highest rates, are collected and expended in the districts of Tanjore and Trichinopoly. At the enquiry of the Public Works Commission in 1869, four wealthy farmers holding lands in three different Taluks or sub-divisions of the Tanjore District gave the following lists of 14 items of communal labour (Kudi-maramat), which, as they said, " is not exacted from us by the authorities, but we undertake it of our own accord."

Within the boundaries of the village.

1. Clearing large irrigating channels.
2. Do branch channels.
3. Do minor channels.
4. Do channels connecting the irrigating with the drainage channels.
5. Do the drainage channels.
6. Embanking or repairing the embankment round the village boundary.

7. Embanking the Kattaleis or blocks of fields.
8. Embanking the fields.
9. Embanking and repairing the small ponds used as seed beds.
10. Preparing the fields by digging pits in them, to remove accumulated soil, and levelling them properly.
11. Repair and erection of earthen and masonry dams and sluices in the channels through the fields.

Beyond the boundaries of the village.

12. Slight clearing of the irrigating channels during low freshes in the rivers.
13. Erection of earthen dams in the rivers at the heads of the channels.
14. Clearing the channels when the banks are injured by freshes.

The actual money value of the communal labour thus given is very difficult to estimate, seeing that most of the labourers are the farm-hands or hinds of the landholders or ryots, and work wherever their masters send them, receiving their wages in kind. A single temporary dam in the Cauvery in the Trichinopoly District was roughly estimated by the Engineer to cost Rs. 4,000 (£400). The four ryots of Tanjore above referred to estimated the value of their communal labour at a trifle less than one rupee per acre of the irrigated area. There are just 700,000 acres of river-irrigated land in Tanjore, and this would give a total annual value approaching to seven lacs of rupees (£70,000) for the communal labour of that district. This would, no doubt, be an excessive estimate were it not that in the list above given are several items, such as embanking the fields, and lowering the level of fields as the silt deposits make it necessary, which are part of the regular routine work of every individual farmer, and have no claim at all to the title of communal labour. The Collector of Tanjore, Mr. G. Lee Morris, a man with exceptional knowledge of the district, roughly estimated the total value at about three lacs of rupees (£30,000) for the whole district, or rather less than half a rupee per acre under river-irrigation. Taking the figures given by three of the chief native irrigated Taluks or sub-divisions of the district, the total value of communal labour comes to rather less than three lacs of rupees (£30,000).

Mr. McCallum Webster showed that in the Sub-division of the Coimbatore District, the old grain payments for communal labour had been converted into a money payment on the acreage irrigated, which *averaged* Rs. 1-6 (2*s.* 9*d.*) per acre. This amounted to 18 per cent. on the assessment, but, as already stated, was levied on the acreage and not on the assessment.

But these arrangements, which make an excellent show on paper, are apt to fail egregiously in practice. Everything depends on the voluntary agreement of the ryots, for there is no legal obligation to enforce the payment of a voluntary cess, and as will presently appear, the legal obligations that do exist regarding customary communal labour are void of effect. The result in most districts is that except where the Revenue officials use all their influence to support and enforce communal labour, it rapidly dies away. A single recalcitrant ryot may, by his refusal to unite for the common good, induce the rest of the village to follow his selfish example. There is no question that public officers in the present day do not take the same personal interest in utilizing this communal labour for the public good as their predecessors in former times. Many of them know little or nothing about the matter, and most leave it to the chief native revenue officer (Tahsildar) and the villagers as being a delicate subject to meddle with.

The only legal provision for the enforcement of customary labour is Section 6 of Act I of 1858, which runs as follows :—

> Sec. 6.—Whenever by local custom any work for the purpose of irrigation or drainage or connected therewith is usually executed by the joint-labour of a village community, any person bound by such custom to contri-

cause to comply with a requisition for such customary aid made to him by the head of the village under the orders of the Tahsildar or other superior Revenue officer, shall be liable to pay a sum equal to twice the value of the labour which he is bound to contribute. The amount so payable shall in case of dispute be determined summarily by a village punchayet assembled by order of the Collector through the village Munsiff, according to the rules for assembling such punchayets prescribed in Regulation V and VII of 1816. Such amount shall be payable on demand; and on non-payment, the same may be recovered by the same means by which arrears of land revenue are recoverable. All sums paid or recovered under this section shall be applicable to the expenses of any works for the purpose of irrigation or drainage executed for the benefit of the village communities to which the defaulters respectively belong."

Here the first difficulty is that legal proceedings have to be taken against each separate defaulter on each separate occasion, and practically on the motion of village officers, who, if they complained at all, would probably be accused of doing so from private enmity. The Collector, burdened already with the multiplicity of his duties both as a revenue and a magisterial officer, would bring administration to a deadlock, if he devoted himself to putting the ponderous machinery of a Jury (punchayet) &c., into motion against every one who refused to give as his share a few days' labour in removing silt from a channel. But a more important objection is that when by the supineness of the village communities, or of the officers of Government, or both, the custom has fallen into desuetude, the Act no longer applies. "Whenever by local custom any work . . . . *is* usually executed," and when the custom has fallen through and no work is ever executed, clearly no one "is bound by such custom to contribute." It is a singular feature of the centralizing tendency of our bureaucratic rule that the village communities have lost much of the power of self-rule and self-help they formerly possessed. The native jury-system, the Punchayet, has been rudely shaken. The decisions of such a body, if ever it sits, no longer bear the old authority, and for the upkeep of irrigation works the punchayet or native jury cannot be relied on; it has practically died out.

In this changing and changed condition of the village communities it is clearly hopeless to expect that the old machinery can again be set in motion. The old plan whereby the villagers, accepting as law the orders of their immediate superiors, settled among themselves the contributions due by each ryot towards the common duty of maintaining the irrigation of works, levied such contributions in manual labour, or grain, or materials, or money, and finally carried out the work, has decayed beyond remedy.

CHAPTER V.

Remedies *(Continued)*.—Revival of Communal Labour.

The Public Works Commission of 1869 recorded among the results of their enquiries; that (1) "Customary labour has not been afforded to the extent necessary or formerly prevailing," and (2) "The difficulty of enforcing customary labour has increased." There was an almost unanimous concurrence of testimony in support of their proposal which is still more urgent now than it was then, that "*customary labour* [*i. e.*, customary communal labour] . . . should be enforced by legal enactment." But though most persons conversant with the subject will probably give an unhesitating assent to this conclusion, it is from this point onwards that the greatest difficulties arise, and the greatest conflict of testimony and opinion takes place. What is the legal enactment to define and enforce? How can the varying quantity known as "customary communal labour" be stereotyped in an Act? If it has languished into nonentity, how can it be recreated? If converted into a money rate, are the villagers, or the Revenue authorities, or the Department of Public Works, to have the spending of the proceeds; and whichever secures the spending, will not the other two bodies protest that the money might be better laid out; and will not the villagers in particular in all probability have to pay the money rate, and to do a lot of communal work as well?

The following suggestions are offered in the hope that they may afford something like a practical solution of these difficulties. It must be rembered that since 1869, when the Public Works Commission sat, the difficulties attending the expenditure on district roads, sanitation, and elementary education have been solved by the Local Fund Act introduced by Sir A. J. ARBUTHNOT, now a member of the Governor-General's Council.

This Act hands over all these matters, with the funds applicable to them, to be administered by District Boards under suitable rules and restrictions. Whatever opinions may have been held originally as to the formation of these Boards, there will probably be few either among officials or non-officials who would now advocate their abolition. There is probably not a single officer of the Revenue or Public Works Departments who does not know many times more of the needs and resources of his district, in roads, bridges, sanitation, hospitals, dispensaries, vaccination, and elementary education, than he would have known if the Local Fund Act had never existed. This admirable legislative achievement has in fact created a systematic organization devoted to these useful objects throughout the Madras Presidency. It has effected two other most admirable results. It has practically united the officers of the Revenue and the Public Works Departments on all matters falling within the scope of the Local Funds Act, by submitting their different proposals and suggestions to the decision of a Local Fund Board where both are represented. And last, but certainly not least, it has secured the presence and co-operation of non-official natives as members of the Board, in the administration of the country. It may be said that the natives vote as the President and Collector wishes; but this is certainly not universally the case, for the present writer has, on more than one occasion, seen the President of a Board outvoted by the native members. Even if it were otherwise, the presence of the non-official native members would always be a great advantage. The topics for decision must be explained to them, and are likely to be modified if the arguments in favour of them are palpably weak. The native members are at liberty to express supplying the district officials with knowledge they would often fail to obtain through merely official channels. It is now suggested that a somewhat similar system, suitably modified, should be established by law, with the double object of enforcing and extending communal labour, and of exercising a thoroughly efficient superintendence and control over works of irrigation, including the distribution of the water.

First, then, as to the enforcement and extension of Communal Labour. The preamble of the new Act might run "Whereas by the ancient customs of this country, the aid of the village communities ought to be given towards the maintenance and repair of public works of irrigation in which they are interested, it is enacted as follows." Taking this as a starting point it will be desirable first of all to fix some money-standard or rate to which the communal labour can, if necessary, be converted under conditions to be described hereafter. Is this standard or money rate to be fixed at so much per acre of the irrigated area, or at so much per rupee of assessment? The Road Fund and Village Service cesses are fixed at so much per rupee of the land assessment, and this is perhaps desirable as the varying rates of assessment are supposed to represent the varying values of the lands. With regard to irrigation, however, the case is different. The natives in assessing themselves for this purpose almost universally fix their contributions at so much per acre. They say, justly enough, that the poorer lands require quite as much water as the rich, if not more, and although the richer lands are generally nearer the source and more certain of irrigation, yet if the owner paid a larger contribution he would certainly think he was entitled to receive a larger supply of water. The great point, however, is that the natives are accustomed to this method of taxing themselves, and if the tax is to be enforced by law, no change of system should be made without the

The facts already stated may be taken as a guide to the rate per acre at which the cess should, when necessary, be levied. The four native farmers of Tanjore examined by the Public Works Commission in 1869, explained that they paid nearly a rupee an acre on communal labour, and in Coimbatore, the average rate at which the ryots converted the communal labour into money was R. 1-6-0 (2*s.* 9*d.*) per acre. It might be provided, then, that the communal labour to be required of the community on any work of irrigation shall not, when estimated in money, exceed annually the sum of one rupee per acre of the irrigated area, except under the following conditions:

(*a*). If the communal labour usually expended on any irrigation work at the time of the passing of the Act exceeds in value of labour or in money, the sum of one rupee per acre, then such sum shall thenceforth be regarded as the amount of communal labour which may be required of the community.

(*b*). If the landholders of half the area under any irrigation work shall desire to contribute in communal labour a greater sum in money or labour than one rupee per acre, then such sum as may be agreed upon by them shall be the amount of communal labour required from the landholders of the whole area irrigated.

Before proceeding to discuss the conditions under which the whole or any part of such a communal labour cess should be collected, it will be advisable to show that the total value of land assessment, *plus* communal labour, paid by the landholders, would not in any case reach the value of the half net produce which is the share claimed by Government out of the yield of the soil. To show this, it will be necessary to refer to the data and calculations of the Settlement Department. This will be done as briefly as possible; and with this view reference will be made only to he best and the worst classes of land, paying the highest and the lowest assessment respectively. As the settlement rates fall in regular gradations from the highest for the best land down to the lowest for the worst land, the same proof is applicable throughout.

Taking the settlement data of the Coimbatore District as prepared after actual experiments, we find the gross yield of the best irrigated land to average above 1,200 Madras measures, or 50 Imperial bushels, of unhusked rice. The gross yield of the poorest irrigated land is 300 measures, or 12½ Imperial bushels per acre. To ascertain the Government share, which is half the *net* produce, the yield is converted into a money equivalent at a fixed rate. The commutation rate fixed in this case was the average market price for 20 years ending with 1865. As a great rise in prices has taken place during the last ten or fifteen years, it is evident the gross value of the outturn must be greatly underrated. Below are given the results of calculating the Government share of the produce, (1) on the average of prices from 1845 to 1865, (2) on the average of 1855 to 1865, and (3) on the average of 1865 to 1875, the year before the famine. The average value from 1845 to 1865 was Rs. 126 per garce,* or 25 Madras measures (75 lbs.) per rupee of unhusked rice. The average from 1855 to 1865 was Rs. 168 per garce, or 19 Madras measures (57 lbs.) per rupee. The average from 1865 to 1875 was Rs. 212 per garce, or 15 Madras measures (45 lbs.) per rupee. The following figures show how the value of the Government share, or half net produce, is arrived at for each rate :—

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* 1 Garce = 3,200 Madras Measures. 1 Madras Measure = 93·75 cubic inches.

Statement showing value of Government Share of produce in unhusked Rice.

Unhusked Rice per garce of 3,200 Madras measures.	Value.	Deduct ⅕th for vicissitudes of season.	Remaining gross value.	Deduct cultivation expenses.	Net value.	Government Share.	Actual Government Tax or Assessment.
	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS.
Best Soil.							
Value of 1,200 measures or 50 bushels at 126 Rs. per garce	47 4 0	9 7 2	37 12 10	13 2 10	24 10 0	12 5 0	12
168 Rs. per garce... ...	63 0 0	12 9 7	50 6 5	15 9 1	34 13 4	17 6 8	
212 do. do.	79 8 0	15 14 5	63 9 7	18 1 2	45 8 5	22 12 2	
Worst Soil.							
Value of 300 measures or 12½ bushels at 126 Rs. per garce	11 13 0	...	11 13 0	4 12 10	7 0 2	3 8 1	2¼
168 do. do.	15 12 0	...	15 12 0	5 11 9	10 0 3	5 0 1	
212 do. do.	19 14 3	...	19 14 3	6 11 5	13 2 10	6 9 5	

Here it is clearly shown, and the statement cannot be controverted, that if the Government share of the produce were commuted into money at the average market prices of 1865 to 1875, *before* the great rise of prices caused by the famine of 1876, the Government tax or assessment on the best irrigated land would be nearly Rs. 23 per acre, and on the worst irrigated land Rs. 6½ per acre. Instead of this the average rate has been so fixed that only Rs. 12 per acre is levied under the new settlement on the best land, and only Rs. 2½ on the worst. The land assessment is in fact calculated on the datum of a market value to which prices will never again fall. On the best lands too, it will be observed that 20 per cent. is deducted on account of possible vicissitudes of season. Thus the undeniable fact is that the Government are treating the ryots with such leniency that both on the best and on the worst land they levy less than half the amount which is their recognised share of the produce. It is unnecessary to repeat the same proof for the gradations of assessment levied on the various classes of soils. The assessment imposed on these is based upon actual experiment, and is calculated in the same way. It is obvious then, that there is an ample margin between the land assessment which the Government *might* demand, and that which actually is demanded, to allow all ryots or landholders to provide the full amount of communal labour here suggested.

Englishmen interested in India, having got rid of the idea that India is a very rich country, are now in danger of falling into the equally mischievous error that all inhabitants of India are equally poor. Taking the agricultural population of the Madras Presidency generally (excluding the people on the West Coast), there is a broad line of division between the thoroughly prosperous and well-to-do, and those who are but little removed from poverty. To the former class belong those who hold permanently irrigated land, that is land which is to all human calculation secure of water-supply from channels, reservoirs, or wells. To the latter belong, in varying gradations, the far larger class of *all who do not.* The first class, however, includes a most important and extensive section of the population, including the majority of the landholders of the irrigated tracts in Godavery, Kistna, Trichinopoly, Tanjore, much of Coimbatore, of Tinnevelly, of Madura, and of other districts.

The area thus certain of irrigation and permanently protected against drought throughout the Presidency is estimated by the Board of Revenue to exceed two million acres. The land assessment payable to Government on this area is about 110 lacs of rupees (£1,100,000). In enforcing what might be called "the communal labour cess," there would be no hardship requirig the maximum amount from the ryots of those lands that are secure of water and of crop.

But in the newly irrigated delta tracts of the Godavery and the Kistna, where the distribution of the water is efficient, and where, moreover, the water-rate is not a consolidated charge upon the land, but is charged at so much per acre as the water is used, it is probable that the present scheme would be inapplicable, at all events without important modifications. Deducting, then, half a million of acres on account of the newly irrigated delta lands of these two districts, there remain a million and a half of acres on which the full amount of communal labour would be demanded. The communal labour on this area, at the value of R. 1 per acre, would be worth 15 lacs of rupees (£ 150,000) per annum. With such aid as this, it would not be too much to anticipate that the public irrigation works would be maintained in a state of the highest efficiency, and that a perceptible diminution of the State expenditure on minor repairs might be expected. A larger expenditure of State funds could then be made to put inferior irrigation works into an efficient condition.

The lands less certain of irrigation amount to a million and a half of acres, assessed at 70 lacs of rupees (£700,000). If half the amount of communal labour required for the permanently irrigated lands were required for these inferior, we should further have labour worth Rs. 7,50,000 (£75,000) per annum expended annually, for the most part on rainfed tanks which are now deplorably neglected by the people.

It is no Utopian fancy that the landholders themselves rate. There are many cases where the villagers have offered to subscribe considerable sums for the execution of works in which they were interested, but there was usually the request, sometimes the condition, that it must be distributed rateably over the irrigated area, and be collected by the Government officers in the same way as the State revenue. An intelligent community is often anxious to carry out some favourite scheme of improvement, but a single recalcitrant objector can often put a stop to it all. If he will not subscribe, neither will they, and so the scheme falls through. During the settlement of the Tinnevelly District, more than 2½ lacs of rupees (£25,000) were raised by subscription and by the sale of waste lands, and expended upon objects of public utility, chiefly irrigation works. On one channel alone the ryots built forty-six substantial masonry sluices, in lieu of more than a hundred hollow palmyra trunks which had been used as sluices, to the great damage of the channel bank, and to the detriment of the lands at the end of the channel. The channel in question irrigates only 650 acres, and receives an ample supply of water from the first weir over the Tambrapurni river, but the drain of water through the rude wooden escape pipes was so great, that the supply for the lands at the end of the channel was insufficient. In another village the residents built twenty-six new masonry sluices. In another part of the same district, above Rs. 40,000 (£4,000) were subscribed by the ryots, and expended upon a new head sluice and channel in connection with the irrigation work known as the Strivaigundam weir or anicut. In another village, above Rs. 1,000 (£100) were subscribed by the ryots, and expended in clearing away accumulations of silt from neglected public channels. Four villages united to subscribe Rs. 2,500 (£250) to build regulating works to apportion the water-supply, and thus settle an ancient feud. Many similar cases could be mentioned. Indeed so numerous were the applications from village communities desirous of raising subscriptions for works of public utility in which they were individually interested, that the authorities were unable to pay attention to them all.

CHAPTER VI.

Remedies (*Continued*).—Up-keep and Control of Irrigation Works—Irrigation Boards.

Upkeep and Control of Irrigation Works:—In arranging for the detailed and systematic employment of communal labour upon the repair and maintenance of irrigation works, the guiding principle must be decentralization. Local works to be maintained by local means must be supervised by local knowledge and personal interest. The people who contribute either communal labour or an equivalent cess are the very persons who are most interested in seeing it properly expended. The Collector in charge of a district will have a general interest in all the irrigation works in it, but his *personal* interest will be centred in those he happens to have seen. So with the Superintending Engineer of several districts. How then can we secure the personal interest needed for the work in view? No single official will have time enough or knowledge enough for the detailed work of a whole district, thousands of square miles in extent, containing perhaps more than a thousand rain-fed tanks, and a hundred or so of river-fed channels. His interest will be both meagre and scattered.

The most effected system will, it is suggested, be found to lie in the establishment of "*Taluk Irrigation Boards*."* In every taluk there should be an Irrigation Board, comprising as members, the Engineer of the Range, the chief native Revenue officer, called the Tahsildar, and his immediate European superior, and a few other district officials; and together with these an equal or greater number of landholders or ryots interested in the different irrigation works of the Taluk or in as many of them as possible. The Collector should be *ex-officio* President, and the Superintending or District Engineer should be a member of all the Boards. Each separate irrigation channel, and every important rain-fed reservoir should have a non-official native representative on the Board, and all large irrigation channels should have several. Special care should be taken in large channels to secure a representative from the last village irrigated by the channel, where all waste of water in irrigating the villages above would be immediately felt. It would be the duty of every Board at the outset to acquire trustworthy plans and lists showing the course of every irrigation channel in the taluk, and details regarding every bank, cut, sluice, waste-weir, and other masonry work, both for channels and reservoirs, together with full information of the area to be irrigated by each separate sluice. As already observed, there is probably not a single district in the Madras Presidency where this essential information is now in existence. Such ignorance does not redound to the credit of our administration, and is of itself sufficient to indicate the need for some such reforms as are now proposed.

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* A Taluk is a Sub-division of a district. Each District contains from 6 to 12 Taluks.

The collection of the needful information proposed would be a work of time, particularly where professional skill was required to obtain it. But a beginning could be made at once, and much valuable knowledge secured without difficulty. In all surveyed districts there are maps on a scale of 16 inches to the mile, and the first obstacle, that of securing sketches and maps, is thus removed as far as surveyed districts are concerned. All irrigated land would be entered in one of two classes, according to the certainty or otherwise of the irrigation. Remission of assessment on account of scarcity and failure of water at any time during five years might qualify for entering lands under the latter head.

The Irrigation Board would proceed to ascertain the amount of communal labour devoted to each irrigation work by the village communities interested; and in every case, where the amount, as estimated by the Irrigation Board, was of less value than one rupee per acre for permanently irrigated land, and half a rupee for the rest, they would call upon the village communities through their headmen to make good the amount upon repairs, conservancy establishment, and such other work as the Board directed. If any community failed to obey the order thus given, the Irrigation Board would proceed to levy annually the money equivalent of the additional communal labour so required to make up the legal quota, and to expend the amount under their own orders, either through the Engineer or through other agency, on the irrigation work concerned. This is the essential feature of the whole scheme now under elaboration.

The Board might entrust the work to the villagers for payment, or not, according to circumstances. The overseers, watchmen, and other establishment maintained by communal contributions, or by money equivalents, would be amenable to the orders of the Irrigation Board, and their appointment and dismissal would rest with the Board subject to the President's confirmation. The cess would be collected in the same way as the land revenue. A small percentage of the total value of the communal labour would have to be levied in money to meet the contingent expenses of the Board, salary of one or more clerks and overseers, &c., &c. The emoluments arising from grants of land, deductions from the revenue, and the like, now devoted to the maintenance of channel watchmen and overseers, would continue to be applied to the same objects under the orders of the Irrigation Board. No new sluice, cut, or other work, by a landholder or farmer, would be permitted without the formal sanction of the Irrigation Board, and all alterations executed by the Public Works Department out of Imperial funds would be communicated before execution to the Board, who would be invited to express their opinion as to the works most urgently in need of attention. With the approval of the Engineer, the Board should be empowered to alter, diminish, enlarge, and generally regulate the discharge from any sluice or work, consistently with the proper irrigation of the area to be supplied, and to make all arrangements connected with the distribution of the water for the benefit of the community. They would make annual allotments estimated in money for the removal of silt, sand, and vegetation from channel beds, for repairs to masonry, and for all similar needful work. The work would be carried out by the villagers or by the Board in the manner already indicated.

In the case of channels wholly or partially irrigating Zemindari or proprietary estates, it would be advisable to have a representative of the Zemindar or proprietor on the Board, and to provide that in case of dispute as to the distribution of water to such proprietary lands, a jury should be appointed, nominated by the President of the Board on the one hand, and by the Zemindar or proprietor on the other. The basis of decision should be that the works for distribution of water should allow, when water was available, a liberal quantity for the area registered as irrigated in the Zemindari or proprietary estate at the time of the passing of the Act. This amount might be taken at 50 or 100 per cent. more than the quantity estimated as actually required to raise a crop of rice, or say* 6 cubic yards per acre per hour. This, however, is a question requiring examination and professional engineering knowledge. The Irrigation Board would act upon the report of the jury, and no suit should lie against them except upon the matter of fact above noted.

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* 3 cubic yards per acre per hour for irrigation is estimated by the Madras Engineers to be "more than ample with a constant supply, but with an intermittent supply it would probably be requisite sometimes to give more."

Similar provision might be made for other proprietary lands, such as "inams." With regard to ryotwari lands, the holders of which are tenants of Government, it has already been decided by the High Court in the second case already quoted (p. 26) that the Government has full power to regulate the distribution of water for irrigation for the public benefit. The Act might provide that no suit should lie against the Board for any reasonable orders carried out by them for the proper regulation and distribution of water for the irrigation of such lands. In the form in which it is now proposed to enforce communal labour, it will be unnecessary to specify the details of it, except in so far as the value of the communal labour given by the community must be estimated. The list given by the four Tanjore farmers previously quoted (p. 32) may be taken for this purpose, omitting such items as embanking fields, and lowering their level, which are personal and not communal obligations. The repair of weirs, sluices, and other works, of reservoir embankments, and of the supply channels thereof, might also be added. Everything connected with the repair and maintenance of irrigation works *might* thus fall within the limits of communal labour, but it is obvious that the chief expenditure of such labour would fall upon the constantly recurring needs in the way of removing silt, sand, and weeds, strengthening and repairing banks, &c., &c.

The village communities concerned should be held primarily responsible for the safe custody of the irrigation works affecting them, just as they are now held responsible under Act XXVIII of 1860 (S. 9) for the safety of boundary stones erected by Government. In the case of wilful damage to a sluice, weir, channel, or other irrigation work, it should be provided by law that a penalty of twice the cost of repairing such damage should be leviable from the holders of the land irrigated by any work thus damaged, or profiting by the injury of such work. The penalty should be independent of the criminal prosecution to which the actual perpetrators, if discovered, would be liable. The Taluk Irrigation Boards would meet once a month or as often as might be necessary, and a report of their proceedings would be published in the *District Gazette*. They would submit an annual report of all communal work executed, with detailed accounts of all sums of money collected and disbursed under the Act. Great care would be necessary to prevent the proceeds of the cess from being swallowed up by costly establishments, instead of being spent on the actual improvement of the works. The provisions of Act I of 1858 (Customary Labour) for works of sudden emergency and danger might be left practically unaltered. Where two or more taluks are under the same irrigation work, as in Tanjore, it would be open to the President to unite the Irrigation Boards of such taluks for one or more meetings as might be necessary. The Government would reserve power to exempt any district or specified work of irrigation from the operation of the Act. But as the value of the communal labour would then be lost to Government and to the works, this reservation would probably be sparingly exercised. With the checks on the Irrigation Boards already noted, requiring the concurrence of the Engineer before action is taken, there would probably be little difficulty in applying the system throughout the greater part of the Presidency.

CHAPTER VII.

Summary.

To summarize the contents of the preceding chapters. It has been shown that the administration of the old Irrigation Works of the Madras Presidency is, generally, and allowing for exceptions, in a condition far removed from thorough efficiency. The causes of this inefficiency are chiefly four:—

1.—The division of responsibility and authority with regard to the repair and maintenance of the irrigation works and the distribution of the water, between the Revenue Department and that of Public Works.

2.—The neglect and abandonment by the village communities of the immemorial duty of communal labour.

3.—The inability of the officers of Government to enforce the rules they are legally entitled and bound to make for the careful distribution of water for irrigation.

4.—The irregularity and uncertainty of the State allotments for the repairs of irrigation works.

The results of this inefficient administration are—

I.—The gradual deterioration of many important works of irrigation through increasing waste of water; and of a far greater number of minor works both through waste of water and through want of the communal labour that should be given for repairs.

II.—There is a loss to the public revenues, which must be estimated at tens of thousands of pounds yearly, not only on account of lands that could be irrigated and are not, but also on account of lands imperfectly irrigated through waste of water, the assessment of which has to be remitted and cancelled. In 1875-6, there were 156,000 acres assessed at Rs. 6,51,000 (£65,100) nominally supplied by the chief sources of irrigation alone (not including the great delta works of the Godavery and the Kistna), which were neither occupied nor irrigated. In addition to this, Rs. 10,52,000 (£105,200) were remitted on account of 240,000 acres under all sources left uncultivated by the ryots for want of water. A further sum of Rs. 11,90,000 (£119,000) was remitted by Government on account of withered crops, short produce, &c., on an unknown area, all due to deficiency of water.

III.—Whatever may be the loss to the public revenue, the loss to the wealth of the community must be from two to three times as great. To the losses already indicated by the foregoing figures must be added the loss of crop on 136,000 acres left uncultivated for which water would have been available if the ryots had economized it. The assessment on this land Rs. 5,78,000 (£57,800) was collected from the ryots by Government.

To effect the administrative reforms so urgently needed, it is proposed that a Legislative enactment be passed with the following objects:—

(1). To revive and enforce the duty of communal labour among the village communities.

(2). To unite the distinct and often antagonistic influences of the Revenue Department, the Public Works Department, and the village communities, by the establishment of an Irrigation Board in every taluk, on which all three bodies will be distinctly represented.

A method of enforcing the communal labour has been suggested, which has the advantage of leaving the duty in the hands of the village communities either wholly or partly, according as they may be willing and able to perform it, while such portion as may be neglected or declined is converted into a money equivalent, and expended under the orders of the Irrigation Board. The value of communal labour has been estimated by wealthy ryots of Tanjore as nearly a rupee an acre in that district, while in parts of the Coimbatore District, the communal labour has been converted by the ryots themselves into a cess averaging R. 1-6 per acre. If communal labour were required throughout the Presidency to the value of Rs. 1 per acre on about 1½ million acres of land the irrigation of which is certain, and of Rs. ½ per acre on about 1½ million acres of land, the irrigation of which is uncertain, there would be expended on the irrigation works of the Presidency, labour to the value of about 22½ lacs of rupees yearly (£225,000), of which but a comparatively small quantity is now secured.

Under such a system as has been proposed, all irrigation works would, it is believed, be eventually maintained in a state of thorough efficiency. The distribution of water would gradually become economical and systematic. The public revenue would be increased by a sum that might be expected eventually to reach £100,000 per annum or even more. The wealth of the community would be increased by a sum necessarily at least twice as great as the increase to the public revenue. The State allotments for repairs, at present insufficient, would become ample for all purposes, and in course of time could be materially diminished, to the sensible relief of the Imperial Exchequer.

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